Appendix B. Candidate Pesticide Selection

Issue: Before they can be used in California, pesticides must be evaluated and registered by the U.S. Environmental Protection Agency (U.S. EPA) and Cal/EPA's Department of Pesticide Regulation (DPR). The manufacturer must submit data to show the pesticide will not pose unacceptable risks to workers, consumers, or the environment. This data includes information, such as analytical method, which the U.S. EPA uses to establish produce residue tolerances (the legal limit a pesticide is licensed for on that crop). California routinely tests produce for pesticide residues. This data can be used to assess exposure due to ingestion. Within hours, samples are analyzed with screening tests that can detect more than 200 different pesticides. This quick turnaround means DPR can closely monitor the food supply for pesticide residues to ensure food safety and immediately identify a potential problem, should it occur.

However, such sampling and analytical methods used for commodity residue analysis may not be suitable for inhalation exposure because the pesticide of interest generally occurs at much lower levels in air than exists in produce. The lower detection limits required for the purpose of risk assessment (especially for subacute and acute toxicology endpoints) from exposure to pesticides in air may be difficult to achieve and therefore require significant method development. Unlike the requirement for a produce residue method for any pesticide registered in the United States, no similar requirement as a condition for registration exists for a method to assess the levels of pesticides in air.

The Toxic Air Contaminant Program, enacted in the 1980s, established a regulatory framework for the identification and control of toxic air contaminants (TACs). In general, the law focuses on the evaluation and control of pesticides in ambient (i.e., surrounding outdoor) community air. To date, the ARB has monitored for 38 individual pesticides where samples were analyzed for a single pesticide (Attachment 1) at a time. Ten of these 38 are proposed for monitoring in this sampling and analysis plan. This monitoring provides data about ambient air concentrations of these pesticides in high use areas in California; however, the analytical methods are developed to analyze a sample for one pesticide. These methods do not provide a multi-pesticide screen of a single sample.

Since few methods exist at this time for air monitoring where single samples can be collected and analyzed for multiple pesticides, methods development work was required to most efficiently use available resources to monitor as many pesticides of potential concern as possible. As part of the work the Lompoc Interagency Work Group's Technical Advisory Group (TAG) conducted, the TAG reviewed the pesticides used in Lompoc (1996-1998), developed a ranking scheme based on use, toxicity, and vapor pressure (volatility) to prioritize chemicals for which to request methods development. DPR identified two potential laboratories to develop methods for and conduct multi-pesticide analysis of single samples during this last year.

Development of Target Analyte List and Selection of Laboratories

Summary: The TAG reviewed the list of 127 pesticides that were used in Lompoc during 1996-1998, ranked them based on equal weighting of the most current use, toxicity, and vapor pressure information, selected the top 17 from each of these three lists, combined them and removed repeaters to produce a list of 42 active ingredients and additional breakdown products. Then,

DPR submitted this list to at least 12 analytical laboratories to determine their interest and ability to develop methods and analyze air samples for multiple pesticides, and selected two laboratories out of the three that replied to develop methods for a target list of 32 pesticides and 7 breakdown products.

The following are excerpts from notes of TAG discussions about the target analyte list and selection of laboratories.

7/1/99
Attachment 2 shows pounds used for all pesticides applied in Lompoc during 1996-1998. The draft list only includes pesticides for which there was 1000 pounds or more used in 1996-1998. Cycloate does not make the cut under this scheme. Ray would like to see a more detailed description for each pesticide, such as chemical class. The TAG agrees that the three factors, flux index, use, and toxicity should be given equal weight. Lynn will come up with a list of pesticides for which 100 pounds or more were used in 1996-1998, as well as determine the scores for use (Attachment 3). Ray will determine the flux score for each pesticide on Lynn's list based on vapor pressure, soil adsorption, and water solubility. Sharon will determine the tox score for those pesticides that are ranked high for both use and flux. We discussed the option for monitoring non-ag pesticides, but made no decision.

7/13/99
We discussed various weighting schemes for flux, use, and toxicity. The TAG agreed that we should weight all three factors equally. Ray, Lynn, and Sharon will proceed with determining the scores for each pesticide on the list produced by Lynn. We discussed the pros and cons of monitoring for non-agricultural pesticides. There was no consensus and we will discuss at future meetings.

7/22/99
Randy will provide the vapor pressure, water solubility, and soil adsorption data to Ray. We will try to complete the rankings by August 6. Joe checked for the notices of intents for sulfuryl fluoride in 1998. Unfortunately, they have been discarded. We may want to check the NOIs for 1999 in a few months.

8/23/99
Phase 2 Analytes – We discussed several ranking schemes for the phase 2 candidates. For pesticide use we discussed using arithmetic intervals or logarithmic intervals. We favor using Joy's second option. For flux we discussed some of the shortcomings of the ranking scheme. The equations used by Ray to estimate flux do not account for reentrainment or drift. We may want to try to account for these processes in the rankings. The soil or plant flux estimates are probably most appropriate since none of the pesticides are applied directly to water**. We decided to consider a different scoring scheme. Randy will take the top 10-20 chemicals from each of the three categories, combine all three lists, take out the repeats, and compute up with a composite list of approximately 30 chemicals (Tables 4a, b, c and 5).**

9/3/99

According to Lynn, George is satisfied with Randy's draft list. George would like an informal survey of several labs as soon as possible. We discussed Ray's proposed revisions to the list. Most people felt that DDT and the other chemicals were unnecessary. **We agreed to include sulfuryl fluoride because of its vapor pressure**. We may want to drop anilazine and glyphosate because of low use and/or difficulty with the analysis. **We agreed to include chemicals from Sharon's revised toxicity ranking. These include naled/DDVP, thiophanate-methyl, and dicofol. We agreed to include the breakdown products MBC, oxygen analogs, ETU, and methamidophos.** There are several options to contracting. We will make a decision after an informal survey of labs.

9/15/99
Randy sent the lab survey to approximately 12 labs earlier in the week (Tables 6 and 7). Randy will contact EPA for additional suggestions for labs.

11/18/99
Three proposals for laboratory analysis of samples to be collected in Phase 2 have been submitted: UNReno, UCDavis, and Battelle. It was agreed that the UCDavis and Battelle proposals were the best.

Randy indicated that he feels both can do the job, and that Battelle may have more technology but UCDavis has more experience. He also noted that DPR is currently prohibited from contracting with a commercial laboratory, but would be able to do an interagency agreement with UCDavis. The State Personnel Board is currently reviewing that decision. We may also have a problem with doing an out-of-state audit. A discussion ensured on the benefits of both labs.

The selection of chemical for monitoring and analysis in Phase 2 was discussed. It was decided that an additional column will be added to the table which ranked the chemicals by priority. **It was unanimously agreed that sulfuryl fluoride would be added to the list of chemicals of concern**.

12/6/99
Randy and Lynn met with Battelle and UCDavis on Friday (12/3). Both labs have viable proposals. Battelle has less experience with air samples but were willing to try to develop methods for additional chemicals. They also said they could attempt canister analysis. They have two levels of QL's. They prefer to work with the higher QL's but at an additional cost will go to lower QL.

UCDavis has experience with air samples but would prefer to only do analysis on chemicals they already have methods for. They are comfortable with around 30 chemicals. They will not do canisters.

Randy reminded the group that the State Personnel Board still does not allow DPR to write contracts with outside laboratories.

Randy proposed that we go with UCDavis now and begin work on the 30 or so chemicals they

have methods for. The ones they can do tend to be used earlier in the year when monitoring was originally proposed. If we want others we can contract with Battelle for the others that are used later in the year.

12/15/99
It was discussed if the TAG would want labs to determine methods of analysis for the harder-to-analyze chemicals (for example, fosetyl aluminum, maneb, mancozeb, or ETU). USGS, UCDavis, and Battelle were not real interested in trying. Lynn and Sharon felt we should try for maneb and mancozeb but not fosetyl. Randy proposed that we establish contract with UCDavis for chemicals they have methods for and put rest of chemicals out to proposal.

Randy noted that another advantage of going with UCDavis with the GC analysis and going out with the LC analysis is that no other state lab can do LC work which means we may be able to contract out. Ray felt there was not enough information to make a decision. He would also like to see analysis for acephate and Methamidophos.

It was agreed that we should not wait for DPR to be able to do an outside contract.

1/04/00
It was suggested that we focus on the most volatile pesticides for Phase 2 since we have limited funds and analytical methods are not available for all pesticides on the list. The discussion turned specifically to sulfuryl fluoride. It is not a fumigant used in agriculture, yet used for home and structural fumigations. The laboratories responding to Phase 2 do not have a method for this pesticide. Should we develop a method, at a potentially high cost? Since funding is from the state legislature for this phase, it was suggested that the LIWG discuss this question.

We don't have a method for analyzing ethylene thiourea (ETU), the significant breakdown product of maneb. TAG members discussed various ideas including sampling of particulate matter for maneb and mancozeb and assume all converted to ETU. This idea is unrealistic because not all parent material is converted to ETU. Another idea was to use the %ETU in the formulated product or the %ETU deposited on plant surfaces to estimate the amount of ETU in air. It was decided that Jim Sanborn would research the scientific literature on parent compound conversion to ETU.

Discussed the amount of money we have and how best to spend it. There was a suggestion to try and eliminate some of the pesticides from consideration based on a ranking scheme. This ranking could be done on vapor pressure, use, and perhaps a toxicology number, and then merge that will availability of chemical analytical methods. This will be further explored with the TAG.

1/20/00
The TAG presented key issues to the LIWG for its discussion. The TAG has discussed sampling and analysis of the candidate pesticides with UCD, Battelle, and US Geological Survey. The pesticides can be separated into three groups: those that can be analyzed by gas chromatography (at UCDavis), those that can be analyzed by liquid chromatography (at Battelle), and those that need to be analyzed individually. The TAG has discussed options to maximize ambient air

monitoring in Lompoc. Monitoring at or near the perimeter of specific applications would require a completely different approach. The key issue that applies to analytes selected and the LIWG's response follow:

It is likely that UCDavis can submit an acceptable proposal for the gas chromatography-method pesticides. Alternatively, we may identify a superior proposal through an open bid process. Assuming a UCDavis proposal is acceptable, do we contract with UCDavis for the GC analysis or have an open bid process for everything? The LIWG requested that the TAG ask UCD to submit a proposal for the 30 pesticides that may be analyzed by GC in a single analysis with acceptable detection limts for TAG review. The LIWG suggested we evaluate the other pesticides with a consultant.

2/07/00
UCDavis can do the analysis. They can do 30 compounds in a single method. If we go to a high volume sample to get lower detection limits it will create a problem for the lab. A discussion followed about using a filter to partition out larger particulates but the discussion was cut short because of time

3/4/00
Randy drafted the outline for the Lompoc Pesticide Air monitoring Phase 2 Plan (3/4/00) based on comments he received from Jay, Joy, Joe, and Lynn and provides several options for the TAG's review. This plan also includes options that were considered by the TAG, but rejected. These options include:

- *Monitoring for maneb, mancozeb, ethylene thiourea (ETU).* These are high use and high toxicity pesticides compared to others applied in the Lompoc area. However, ETU is a very difficult chemical to analyze. It is doubtful that an adequate method for ETU can be developed with the available time and resources. Monitoring for maneb and mancozeb are of limited value without ETU.
- *Monitoring for sulfuryl fluoride*. This is a fumigant used only for structures. Although this is a high use and high volatility pesticide compared to others used in the Lompoc area, monitoring for this chemical would require different sites. In addition, sulfuryl fluoride can only be monitored as a single chemical, not part of a multi-pesticide analysis of a single sample.
- *Analyzing for Tentatively Identified Compounds (TICs).* The UCD method is set up to identify and quantify specific chemicals. It is possible to attempt to identify other chemicals contained in the samples. The sampling method does not capture all possible chemicals and the analytical method cannot identify all possible chemicals. All possible chemicals cannot be identified. Unequivocal identification requires a standard for comparison. UCD may or may not have standards to compare to TICs. There will be no quality control for the TICs. The air concentration of the TICs will be unknown. It is possible to expend significant time and resources and not identify the unknown chemicals. It is likely that some of the TICs will not be pesticides. DPR has no role for non-pesticides. Many of these shortcomings can be overcome with follow-up monitoring, the way we are doing for cycloate identified in Phase 1. No follow-up monitoring is planned for Phase 2.

3/8/00
UCDavis Proposal – The group discussed the proposal and use of remaining funds. Lynn wants to see the chemicals on the list that UCDavis can not do be put out to bid. George would like a search done for someone who can do analysis for maneb and ETU. He also suggested looking for maneb in house dust, but others suggested it would be hard to interpret exposure to humans. Martha will research whether anyone has tried to look for maneb or mancozeb in household dust.

Carbamates and other chemicals – The discussion turned to carbamates and analysis for Oxamyl, methomyl and analysis for oxydemeton-methyl. Randy will check with UCD to find out how much it will cost to get analysis for oxydemeton-methyl. Lynn mentioned they were unable to find it when ARB had done some application monitoring for the chemical. Jim will do a literature search to see if anyone has done other work on it.

Tentatively Identified Compounds (TICs) – Randy noted that we could end up spending the money on TIC analysis and not find anything. We could also find something but would not be able to verify the results. Martha and George felt it was worthwhile to identify possible chemicals that we could follow up later one. Jim felt the group would need to set criteria for determining peaks so time and money will be spent wisely. Lynn suggested we might be able to use TIC analysis to look for maneb and mancozeb.

Jim said he felt we should look for carbamates first. Martha didn't see much use in looking for carbamates and wanted to concentrate on the TIC analysis. Randy noted that Joy's email indicated she wanted to put all the money in the UCD proposal for more samples we know would have good results. Lynn would like to look for more chemicals. Randy will call Battelle and UCD to find out costs for analysis of shorter list (LCMS analysis) and TIC analysis.

Sulfuryl fluoride – Jay felt it was a low priority. Jim will call the registrant to see what the method detection limit is and if they have an ambient air method. Lynn felt if we do sulfuryl fluoride it should be associated with fumigations.

3/14/00
Randy and Lynn talked to Don Kenny/Battelle lab for costs of additional analysis. Kenny estimated $150,000 (method validation and about 20 samples per week for 10 or 12 weeks) for all the chemicals on the LCMS list. The chemicals that may be the most questionable are thiophanate methyl, iprodione, thiodicarb, and sulfur.

[5/25/00 Note:

- Disulfoton was dropped from the final candidate list because it has to be analyzed separately, too expensive.
- ETU (a breakdown product of maneb and mancozeb) although high toxicity, was dropped due to difficulty with analysis
- Fosetyl-aluminum (high use, low flux, low toxicity) was dropped due to difficulty with analytical method
- Glyphosate (high use, low flux, low toxicity) was dropped due to difficulty with analysis

- Mancozeb dropped due to difficulty with analysis and monitoring data of limited value without accompanying data on more toxic breakdown product (ETU).
- Sulfur—UCD not able to develop method as part of multi-pesticide screen
- Sulfuryl fluoride (high use on structural, not ag, high vapor pressure). Used only for structural applications. Although high use, high volatility, monitoring requires different non-ag sites. In addition, can only be monitored as single chemical, not part of multi-pesticide screen.
- See Tables 7 and 8 in SAP for list of target analytes for which the labs are developing methods.]

California Environmental Protection Agency
AIR RESOURCES BOARD

ATTACHMENT #1

January 2000

PESTICIDE MONITORING PROGRAM FACT SHEET

The Air Resources Board (ARB) measures outdoor (ambient) concentrations of pesticides in the air at the request of the Department of Pesticide Regulation (DPR). As required by law, the DPR uses the monitoring data from the ARB, information from any prior monitoring studies, and toxicological data on health effects to determine whether certain pesticides pose a potential threat to public health and should be identified as toxic air contaminants (TACs). If a pesticide is identified as a TAC, the DPR will evaluate current public exposure and consider any need for changes in the way the pesticide is used to reduce public exposure.

For each pesticide being evaluated, concentrations are measured in the ambient community air and in the air near an application. The monitoring is done in a county of high use, during a month of high use. After the DPR asks the ARB to monitor for a particular pesticide, the DPR staff notifies the county agricultural commissioner. After this initial contact, the ARB staff contacts the agricultural commissioner's office to receive specific information on the location and timing of anticipated applications of the pesticide, as well as names of applicators or growers likely to be using the particular pesticide.

For ambient measurements, monitoring is done at three to five sites (e.g., at schools) near agricultural areas expected to receive applications of the pesticide being monitored. In some cases, we also look for atmospheric breakdown products of the pesticides. Samples of 24 hours in duration are collected four days per week on weekdays for five to six weeks. Samples are also collected at an urban area background site away from pesticide applications.

In addition, short-term monitoring (e.g., range of 1-2 hours to 24 hours) is also done for up to three days around a field during and after an application of the pesticide. Prior to this application site monitoring, the ARB staff contacts applicators or growers to request access to their land to monitor near an upcoming application of the pesticide. The monitoring results are not intended to become the basis for taking enforcement action against any specific grower or applicator.

Following the monitoring, results are given to the DPR, the Office of Environmental Health Hazard Assessment, the county agricultural commissioner, local air pollution control officer, and the applicator or grower (in the case of application site monitoring). Results are available to other interested parties. Since the monitoring program began in 1986, the ARB has conducted air monitoring for 43 pesticides at the request of the DPR and other agencies. A list of these pesticides is attached.

For information about the DPR TAC program, see:
www.cdpr.ca.gov/docs/empm/pubs/tacmenu.htm

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AIR RESOURCES BOARD PESTICIDE MONITORING
(as of January 2000)

Pesticide	County where monitoring was done	Report Available from ARB Ambient	Application
Aldicarb	Fresno	Yes	Yes
Amitraz	Kings	Pending	Pending
Atrazine	Sacramento	Pending	Pending
Azinphosmethyl	Kern, Glenn	Yes	Yes
Benomyl	Kern	Yes	Yes
Bifenthrin	Kings	Pending	Pending
Bromoxynil	Imperial	Yes	Yes
Captan	Kern, Tulare	Yes	Yes
Carbofuran	Imperial	Yes	Yes
Chloropicrin	Monterey	Yes	Yes
Chlorothalonil	Fresno, Ventura	Yes	Yes
Chlorpyrifos	Tulare	Yes	Yes
Cycloate	Imperial	Pending	Pending
DEF	Fresno, Kern	Yes	
Diazinon	Fresno	Yes	Yes
1,3-dichloropropene	Merced	Yes	
Diquat dibromide	Kings	Pending	Pending
Endosulfan	Fresno, San Joaquin	Yes	Yes
EPTC	Imperial, San Joaquin	Yes	Yes
Ethoprop	Siskiyou	Yes	Yes
Ethyl parathion	Fresno, Tulare, Kern, Imperial	Yes	
Fenamiphos	Fresno	Yes	Yes
Garlon 4/ 2,4-D	Humboldt, Del Norte	Yes	
Linuron	Kern	Yes	Yes
Malathion	Imperial	Yes	Yes
Mancozeb	Kern	Yes	Yes
MITC (metam-sodium)	Contra Costa, Kern	Yes	Yes
Methidathion	Tulare	Yes	Yes
Methomyl	Fresno	Yes	Yes
Methyl bromide	Monterey, San Joaquin, Fresno	Yes	Yes
Methyl parathion	Colusa, Sutter	Yes	Yes
Molinate	Colusa	Yes	Yes
Monocrotophos	Fresno	Yes	Yes
Naled	Tulare	Yes	Yes
Oxydemeton-methyl	Monterey	Yes	Yes
Paraquat	Fresno, Kern	Yes	
Permethrin	Monterey, Butte	Yes	Yes
Phorate	Fresno, Del Norte	Yes	Yes
Propargite	Fresno	Yes	Yes
Simazine	Fresno	Yes	Yes
Sodium arsenite	San Joaquin	Yes	Yes
Ziram	Butte		Yes

ATTACHMENT #2

Pesticide	1996	1997	1998	Total
METAM-SODIUM	11251.48	34972.47	51831.75	98,056
FOSETYL-AL	15840.7	14664.4	15818.92	46,324
SULFUR	7137.896	10193.79	8203.22	25,535
MANEB	7368.164	8784.945	9130.043	25,283
CHLORTHAL-DIMETHYL	6804.356	6601.215	3526.785	16,932
IPRODIONE	4964.377	4682.179	4534.918	14,181
METHYL BROMIDE	680.7	970.94	12150	13,802
CHLORPYRIFOS	4552.84	4669.814	2916.618	12,139
GLYPHOSATE, ISOPROPYLAM	1543.56	6766.711	2097.233	10,408
ACEPHATE	2921.129	2675.693	2381.912	7,979
PROPYZAMIDE	2123.604	2586.852	2294.49	7,005
CHLOROTHALONIL	3593.292	1242.528	1843.433	6,679
DICLORAN	2291.745	2062.995	1896.233	6,251
PERMETHRIN	2150.77	2127.659	1723.291	6,002
METHOMYL	1932.318	3022.38	973.917	5,929
1,3-DICHLOROPROPENE		5849.675		5,850
CHLOROPICRIN	1.5	91.06	4050	4,143
PCNB	54.8925	550.125	2833.883	3,439
THIODICARB	1395.478	1760.928	74.81656	3,231
MANCOZEB	1230.71	996.9681	1001.203	3,229
CRYOLITE	1511.76	820.8	553.68	2,886
VINCLOZOLIN	904.6569	869.5609	900.1268	2,674
OXYDEMETON-METHYL	729.0134	989.0645	882.8147	2,601
BENSULIDE	62.11403	1425.133	1038.524	2,526
OXAMYL	1188.022	749.433	460.997	2,398
ALACHLOR	951.1082	482.0543	946.6817	2,380
NAPROPAMIDE	812	207.75	1243	2,263
MALATHION	1273.755	509.0011	357.5424	2,140
DIAZINON	524.6667	903.221	700.0227	2,128
PROMETRYN	642.1781	592.7105	725.3067	1,960
METALAXYL	1325.726	316.0291	253.2327	1,895
LINURON	446.5	854.45	516.35	1,817
THIOPHANATE-METHYL	335.6063	490.7578	833.91	1,660
METOLACHLOR	407.0736	484.139	697.6708	1,589
2,4-D, DIMETHYLAMINE SALT	413.3978	487.2084	560.9866	1,462
ETHALFLURALIN	637.5556	381.342	385.4798	1,404
DIMETHOATE	199.8054	535.8102	601.0336	1,337
BACILLUS THURINGIENSIS (E	603.0032	430.625	183.2638	1,217
FONOFOS	570.1655	282.0818	220.0639	1,072
PIPERONYL BUTOXIDE	433.3684	584.9594	30.05129	1,048
OXYFLUORFEN	230.4558	330.23	393.4902	954
XYLENE RANGE AROMATIC SOLVENT		490.1715	439.5842	930
SIMAZINE	858.88		41.4	900
PETROLEUM OIL, UNCLASSIF	797.9724			798
CYCLOATE	215.0958	294.1459	288.4965	798
BENOMYL	364.9657	172.0494	254.736	792
NALED	28.35967	230.5659	514.5604	773
MEFENOXAM		399.6432	358.5404	758

COPPER HYDROXIDE	493.6667	135.7355	118.8798	748
PARAQUAT DICHLORIDE	225.5865	401.4455	101.0509	728
ANILAZINE	388.5	177.5	131.375	697
CYPERMETHRIN	289.5614	288.8128	112.6762	691
IMIDACLOPRID	190.2529	182.1634	211.7425	584
TRIFLURALIN	183.4967	199.4558	174.4786	557
SPINOSAD		138.7733	410.6398	549
BACILLUS THURINGIENSIS (B	106.4758	266.5539	70.48983	444
BACILLUS THURINGIENSIS SU	2.025	387.7616	46.5165	436
MYCLOBUTANIL	164.934	155.736	82.0068	403
DICOFOL	287.9147	20.54816	20.04698	329
CARBARYL	209.8	65.58837	37.504	313
ESFENVALERATE	74.45733	117.5329	113.9877	306
NORFLURAZON	292.392	4.716	7.86	305
PIPERONYL BUTOXIDE, TECH	108.3421	146.2398	7.512821	262
CORN PRODUCT, HYDROLYZED		132.7719	76.92344	210
DISULFOTON	204.5273			205
EPTC	81.06864	39.22676	65.37799	186
PROPICONAZOLE		57.06574	125.3003	182
POTASH SOAP	138.9832	4.367468	1.705984	145
ENCAPSULATED DELTA END	84.05638	54.85174		139
FENAMIPHOS	95.48263			95
BENTAZON, SODIUM SALT	95.09195			95
ETHEPHON	84.62722	5.205174	4.310678	94
LINDANE		6.30168	77.41996	84
ENDOSULFAN	8.692873	51.5497	19.66	80
PETROLEUM DISTILLATES, A	8.73734	32.81436	20.58798	62
DIETHATYL-ETHYL	60.00081			60
METHAMIDOPHOS	54.15344			54
GIBBERELLINS	14.6719	15.3269	14.69804	45
TAU-FLUVALINATE	28.60579	11.3695	1.928192	42
MYROTHECIUM VERRUCARIA, DRIED FE		36.28548		36
FENARIMOL	5.823707	13.32097	16.59667	36
BROMOXYNIL OCTANOATE		32.77108		33
SETHOXYDIM	28.03878	0.61335	2.80386	31
AZADIRACHTIN	6.289033	17.52943	5.873242	30
PYRETHRINS	8.030477	8.557481	11.2013	28
MEFENOXAM, OTHER RELATED		11.75421	10.60247	22
ROTENONE	6.692064	6.252915	9.334419	22
ROTENONE, OTHER RELATED	6.692064	6.252915	9.334419	22
MCPA, DIMETHYLAMINE SALT	10.7562	9.219668		20
ETHOPROP	19.02801			19
TRIADIMEFON	2.3875	9.28285	5.770325	17
ALUMINUM PHOSPHIDE	3.196875	7.871875	5.878125	17
SULFOTEP	8.925	3.54375	1.96875	14
KINOPRENE	8.076173	6.068264		14
(S)-KINOPRENE			13.91434	14
PROPAMOCARB HYDROCHLO	13.31301			13
METHIOCARB	1.5	4.14375	6.825	12

AVERMECTIN	6.561536	4.096372	0.273803	11
CLARIFIED HYDROPHOBIC EX	10.12095			10
TRALOMETHRIN			9.843239	10
TEBUFENOZIDE			9.783648	10
PHOSPHORIC ACID	2.117903		6.353708	8
POTASSIUM BICARBONATE			6.15	6
STRYCHNINE	0.035	4.6425	0.2115	5
BIFENTHRIN		1.578302	2.646066	4
ALKYLARYL POLYOXYETHYL	0.937125		2.811375	4
AZINPHOS METHYL	2.5		1	4
BACILLUS THURINGIENSIS (B	0.9	0.896	0.768	3
DIENOCHLOR	0.36119	0.42712	1.733674	3
CARBOPHENOTHION		2.147947		2
LAMBDA CYHALOTHRIN			2.085324	2
CHLORSULFURON	1.00545		0.928125	2
METHYL PARATHION			1.919096	2
(S)-CYPERMETHRIN	1.164934		0.323429	1
COPPER SULFATE (PENTAHY	0.064272	0.425812	0.899811	1
MANGANESE SULFATE		0.687477	0.458318	1
BEAUVERIA BASSIANA STRAIN GHA		0.721217	0.328288	1
TRIFORINE	0.534006	0.214906		1
BACILLUS THURINGIENSIS (B	0.02584	0.228		0
BENDIOCARB			0.19	0
ZINC SULFATE		0.08839	0.058927	0
METHYL PARATHION, OTHER RELATED			0.101005	0
CHLORMEQUAT CHLORIDE		0.023494	0.050126	0
BACILLUS THURINGIENSIS (BERLINER)		0.016		0
DIPHACINONE	0.005	0.005		0
AMPELOMYCES QUISQUALIS		0.0025	0.000507	0

ATTACHMENT #3

Pesticide	1996 Use	1997 Use	1998 Use	Total (lbs.)	
Metam-sodium	11,251	34,972	38,660	84,883	
Fosetyl-Al	15,841	14,667	15,211	45,719	
Maneb	10,792	9,028	8,950	28,770	
Sulfur	7,138	10,194	8,104	25,436	
Chlorthal-dimethyl	6,804	6,601	3,427	16,832	
Iprodione	5,052	4,683	4,460	14,195	
Chlorpyrifos	6,040	4,670	2,847	13,557	
Glyphosate	1,646	7,227	2,012	10,885	
Acephate	2,921	2,744	2,293	7,958	
Propyzamide	2,124	2,587	2,270	6,981	
Permethrin	3,014	2,161	1,666	6,841	
Chlorothalonil	3,654	1,243	1,805	6,702	
Dicloran	2,292	2,063	1,877	6,232	
Methomyl	1,963	3,070	960	5,993	
1,3-dichloropropene	0	5,850	0	5850	
~~Dimethyl poly siloxane~~	865	2,722	764	4,351	
Simazine	4,259	0	21	4,280	
PCNB	55	550	2,793	3398	
Thiodicarb	1,395	1,761	75	3,231	
Mancozeb	1,231	997	999	3,227	
Vinclozolin	905	923	882	2710	
Paraquat dichloride	226	2,354	101	2681	
Cryolite	1,512	821	323	2,656	
Oxydemeton-methyl	729	1,229	687	2645	
Ethalfluralin	1,849	381	385	2,615	
Bensulide	62	1,425	1,026	2513	
Oxamyl	1,188	749	556	2,493	
Alachlor	951	482	751	2184	
Napropamide	812	208	1,142	2162	
Diazinon	525	909	700	2134	
Malathion	1,274	509	341	2,124	
Prometryn	642	593	696	1931	
Metalaxyl	1,326	316	253	1,895	
Linuron	446	854	470	1770	
Thiophanate-methyl	340	498	828	1666	
Methyl bromide	681	971	12,150 ~~1652~~		13,800
Metolachlor	407	484	698	1589	
2,4-D, dimethylamine salt	413	487	561	1461	
Dimethoate	200	536	533	1269	
Benomyl	740	176	246	1162	
Fonofos	570	282	220	1072	
Piperonyl butoxide	433	585	27	1045	
Oxyfluorfen	230	330	342	902	
Cycloate	215	294	282	791	
Cypermethrin	369	289	111	769	
Naled	28	231	502	761	
Copper hydroxide	494	136	119	749	
Mefenoxam	0	400	338	738	

Anilazine	388	177	129	694	
Imidacloprid	190	182	208	580	
Trifluralin	183	199	142	524	
Spinosad	0	0	512	512	
Myclobutanil	175	164	79	418	
Esfenvalerate	182	118	97	397	
Dicofol	288	21	20	329	
Carbaryl	210	66	37	313	
Norflurazon	292	5	8	305	
Piperonyl butoxide, technical, other related	108	146	7	261	
Disulfoton	205	0	0	205	
Propiconazole	0	57	138	195	
Gibberellins	88	89	13	190	
EPTC	81	39	65	185	
Fenamiphos	95	0	0	95	
Bentazon	95	0	0	95	
Ethephon	85	5	4	94	
Chloropicrin	2	91	~~0~~ 4050	93	4143

ATTACHMENT #4A

Pesticide	Total (lbs.)	Use Rank
Fosetyl-Al	45719	1
Maneb	28770	2
Sulfur	25436	3
Chlorthal-dimethyl	16832	4
Iprodione	14195	5
Chlorpyrifos	13557	6
Glyphosate	10885	7
Acephate	7958	8
Propyzamide	6981	9
Permethrin	6841	10
Chlorothalonil	6702	11
Dicloran	6232	12
Methomyl	5993	13
Simazine	4280	14
PCNB	3398	15
Thiodicarb	3231	16
Mancozeb	3227	17
Vinclozolin	2710	18
Paraquat dichloride	2681	19
Cryolite	2656	20
Oxydemeton-methy	2645	21
Ethalfluralin	2615	22
Bensulide	2513	23
Oxamyl	2493	24
Alachlor	2184	25
Napropamide	2162	26
Diazinon	2134	27
Malathion	2124	28
Prometryn	1931	29
Metalaxyl	1895	30
Linuron	1770	31
Thiophanate-methy	1666	32
Metolachlor	1589	33
2,4-D, dimethylamin	1461	34
Dimethoate	1269	35

ATTACHMENT #4B

	VP	Flux Rank
Sulfuryl Fluoride	9150	1
EPTC	2.89E-02	2
Cycloate	1.60E-03	3
Fonofos	3.40E-04	4
Diazinon	1.30E-04	5
Trifluralin	1.03E-04	6
Ethalfluralin	8.80E-05	7
Ethephon	6.05E-05	8
PCNB	5.98E-05	9
Disulfoton	5.40E-05	10
Methomyl	4.90E-05	11
Oxydemeton-methy	3.83E-05	12
Anilazine	3.75E-05	13
Metolachlor	3.14E-05	14
Mefenoxam	2.48E-05	15
Malathion	2.30E-05	16
Chlorpyrifos	2.21E-05	17
Thiodicarb	2.00E-05	18
Alachlor	1.40E-05	19
Metalaxyl	5.63E-06	20
Chlorthal-dimethyl	2.50E-06	21
Chlorothalonil	2.00E-06	22
Dicloran	1.97E-06	23
Dimethoate	1.85E-06	24
Fenamiphos	1.70E-06	25
Myclobutanil	1.60E-06	26
Linuron	1.40E-06	27
Carbaryl	1.17E-06	28
Prometryn	1.05E-06	29
Bensulide	8.00E-07	30
Propyzamide	4.35E-07	31
Propiconazole	4.20E-07	32
Dicofol	3.95E-07	33
Oxamyl	3.84E-07	34
Acephate	2.66E-07	35
Naled	2.63E-07	36

ATTACHMENT #4C

Pesticide	Tox Score
DDVP	10
Maneb	10
Dimethoate	9
Mancozeb	9
Thiodicarb	9
Fonofos	8
Oxamyl	8
Oxydemeton-methy	8
Thiophanate-methy	8
Vinclozolin	8
Benomyl	7
Chlorothalonil	7
Diazinon	7
Dicofol	7
Naled	7
Propyzamide	7
Trifluralin	7
Acephate	6
Cypermethrin	6
Methomyl	6
Permethrin	6
Alachlor	5
Chlorpyrifos	5
Iprodione	5
Linuron	5
Myclobutanil	5
Paraquat dichloride	5
PCNB	5
Bensulide	4
Cycloate	4
Esfenvalerate	4
Ethephon	4
Simazine	4
Chlorthal-dimethyl	3
EPTC	3
Ethalfluralin	3
Fosetyl-Al	3
Imidacloprid	3

Attachment #5

List of pesticides and breakdown products targeted for air monitoring in Lompoc. These were chosen from the pesticides for which at least 90 reported pounds were applied in the Lompoc area for 1996 – 1998. Each pesticide on the initial list was separately ranked for pounds applied, vapor pressure, and toxicity. The top 17 from each of the three categories were combined to make up the list below.

Pesticide (Active Ingredient)	Breakdown Product
Acephate	Methamidophos
Anilazine	
Benomyl	Methyl 2-benzimidazole carbamate (MBC)
Chlorothalonil	
Chlorpyrifos	Oxygen analog
Chlorthal-dimethyl	Monomethyl and tetrachloroterephthalic acid (TPA, MTP)
Cycloate	
Diazinon	Oxygen analog
Dicloran	
Dicofol	
Dimethoate	Oxygen analog
Disulfoton	Oxygen analog
EPTC	
Ethalfluralin	
Ethephon	
Fonofos	Oxygen analog
Fosetyl-Al	
Glyphosate	
Iprodione	
Malathion	Oxygen analog
Mancozeb	Ethylene thiourea
Maneb	Ethylene thiourea
Mefenoxam	
Methomyl	
Metolachlor	
Naled	DDVP (dichlorvos)
Oxamyl	
Oxydemeton-methyl	
PCNB	
Permethrin	
Propyzamide	
Simazine	Deethyl simazine, diaminochlorotriazine
Sulfur	
Sulfuryl fluoride	
Thiodicarb	
Thiophanate-methyl	Methyl 2-benzimidazole carbamate (MBC)
Trifluralin	
Vinclozolin	

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ATTACHMENT #7

To: Interested Parties

Subject: Pesticide Air Monitoring

The Department of Pesticide Regulation (DPR), in cooperation with other agencies, will conduct a complex air monitoring study for multiple pesticides during the spring and summer of 2000 in Lompoc. DPR is seeking one or more laboratories to develop methods and analyze air samples for multiple pesticides.

In 1997, DPR formed the Lompoc Interagency Work Group (LIWG) to help investigate Lompoc residents' concerns (first voiced in 1992) about pesticide use as it relates to community health. DPR has sought answers to whether health symptoms in Lompoc (Santa Barbara County) are occurring at a high rate and if so, to determine whether pesticides may be the cause.

The LIWG is composed of staff from federal, state, and county agencies as well as community representatives. The LIWG formed several subgroups to develop recommendations to address health concerns, to conduct a pesticide air monitoring strategy, and to consider potential exposures from other environmental factors, such as crystalline silica and radon. The pesticide exposure subgroup (now called the Technical Advisory Group) developed a work plan that recommended comprehensive air monitoring in Lompoc during the growing season to determine whether applied pesticides migrate by air to adjacent residential areas. The Technical Advisory Group has prioritized approximately 50 pesticides and breakdown products based on their toxicity, use, and volatility.

DPR is conducting an informal survey to determine the interest and feasibility in analyzing multiple pesticides. Depending on the response from this survey, DPR will either negotiate an interagency agreement with another state agency, or issue a formal request for proposal to select the appropriate laboratory. If you are interested in conducting this work, please provide the following information.

- Name of company or agency
- Address of company or agency
- Contact person
- Phone number
- Fax number
- Email address

- Briefly describe your laboratory's experience in analyzing pesticide air samples.

- Briefly describe your laboratory's quality assurance program.

- Group the pesticides on the accompanying list by proposed sampling and analytical method and briefly describe each method. Briefly describe your laboratory's experience with these methods or similar methods.

- Indicate the approximate time it will take to develop and validate the proposed methods.

The information you provide should be your best guess as to how to analyze the samples. You do not have to conduct any analyses at this time to show the performance of the proposed methods. We realize that one or more analytes may need to be dropped from a proposed multi-residue method once the methods are investigated further. The methods you propose do not need to include all of the pesticides on the list. The information you provide will not be construed as a contractural obligation.

DPR has budgeted approximately $300,000 for the laboratory analysis for this project. Given this level of funding, we cannot monitor for all pesticides on the list. Therefore, we are seeking laboratories and methods that will maximize the number of pesticides and samples we can analyze.

If you are interested in this project, please provide the requested information to me by October 1, 1999. You may send the information to me at the address above, fax the information to (916) 324-4088, or email the information to rsegawa@cdpr.ca.gov.

Thank you for your attention in this matter. Please contact me if you have any questions.

Randy Segawa